

THE AVIFAUNA OF PALM ISLANDS NATURE RESERVE IN LEBANON 1893 - 2000

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ABSTRACT

The paper discusses the ornithological importance of Palm Islands Nature Reserve by reviewing its habitats and avifauna and by enumerating the endangered or vulnerable species that have been recorded in the reserve between 1995 and 2000. The authors compare the recent and old information in view of improving the management plans of the reserve.

Keywords: bird, monitoring, Palm Islands, Lebanon

INTRODUCTION

There is a relative paucity of ornithological information on Palm Islands Nature Reserve (also known as Rabbit Islands or Nakhl Islands). Available information is scanty, conflicting and/ or inadequate. Throughout the past 100 years (1893-1995), there were only very few visits and studies in this region. Amongst these it is worth mentioning the following: J.A. Stenhouse (July 4th 1893 and June 20th 1895), P.A.D. Hollom (May 9th 1956), G. Tohmé & J. Neuschwander (April 3^d and 15th and early August 1973), and several visits by G. Tohmé & J. Neuschwander during 1974 (Tohmé *com. verb.*). All these short-term studies provided a list consisting of 22 bird species only.

Results reported in this paper are based on the systematic and continuous observations (often twice monthly) in the protected area throughout April 1995 – end 2000. These observations have provided enough data to chart breeding, wintering and migration patterns for 154 species. Of these, 139 occur in migration (96 species) and/ or in winter, while 15 are vagrant or with uncertain status. Of the migrating species, 8 are proved to breed in the area and 1 may breed (Turtle Dove

Streptopelia turtur) though there is no direct evidence. Of the remaining 4 species, 2 are resident breeders (Yellow-legged Gull *Larus cachinnans* and Graceful Warbler *Prinia gracilis*), one is apparently resident (Little Owl *Athene noctua*) but without direct evidence of breeding, and one is obviously extirpated (Lesser Crested Tern *Sterna bengalensis*) not only from the reserve but also from Lebanon.

THE STUDY AREA

Palm Islands Reserve (a designated Important Bird Area) is a group of 3 small islands: Palm, Sanani and Ramkine islands. They were first proposed as a special reserve in need of protection by Tohmé *et. al.* in 1973. They were eventually declared a nature reserve by law in 1992. The reserve is situated at (34° 30'N, 35° 46' E) 4 nautical miles north-west of El-Mina/ Tripoli, in north Lebanon. The reserve covers a surface area of 26 hectares of land, plus an infralittoral zone (the sea belt of 500 meters around the islands) of about 4.km².

The reserve, which constitutes an integrated natural marine basin in the eastern Mediterranean, suffered from military occupation during the civil turmoil (1975-1991) and from the introduction of 14 rabbits by a misguided environmentalist in 1984, which proliferate to c.2000 individuals in early 1997. Today these rabbits are subject to a progressive eradication programme. However, alterations in plant cover caused by these rabbits and military operations during the seventies and the eighties have greatly reduced breeding populations of birds.

Palm island, the largest of the three, is mostly flat, without major relief (highest point, 6.5 meters) covers an area of 20 hectares. Its earthen middle separates a rocky shoreline extending from the north-west to the south, and a sandy beach lying from the north to the east. Sanani island is located 500 meters south-east of Palm island and has an area of 4 hectares. It is mainly rocky with a partially sandy shoreline. Ramkine island situated 600 meters north-west of Palm island is highly relieved (highest point 13 meters) with rocks also contouring the shoreline. This island has a small sandy beach and an old lighthouse.

The islands are characterised by a Mediterranean climate, with a rainy season from October through April and virtually rainless summers (May through September) that are hot and humid, with an average temperature of 28°C. (peak temperatures exceeding 38°C). Average humidity in summer is 65-75% with peaks up to 90%. Winters are characterised by a temperate weather. Prevailing wind is from the west and south-west (80% of the time). The rest of the time, the wind blows from the east and north-east.

The patchy vegetation of the reserve is of degraded garrigue-type and has a cover not exceeding 40%. It consists mainly of scattered low bushes, scrubs, and annual herbs, except in spring and in summer when carpeted in wildflowers. Among

the plant species: Long-spiked Glasswort *Arthrocnemum macrostachyum*, Coast Spurge *Euphorbia paralias*, Yellow-horned Poppy *Glaucum flavum*, Sea Daffodil *Pancrantium maritimum*, Rock Samphire *Crithmum maritimum*, Spiny Caper *Capparis spinosa*, Toad Rush *Juncus bufonius*, Egyptian sea-rocket *Cackile aegyptia*, Sea Holly *Eryngium maritimum* and Field Pimpernel *Anagallis arvensis*. In addition Palm island exhibits two stands of reedbeds *Phragmites communis* and very few scattered medium-sized palm trees *Phoenix dactylifera* (Tohmé, 1999).

METHODS

To census birds, we used the 20-minute point-count method, whereby all species noted during this time period are recorded at different places and different times of year in the most characteristic habitats of a given area (Blondel 1975, Blondel *et al.* 1981). This method is semi-quantitative and changes in abundance of a species are estimated by changes in the frequency of this species over a series of point counts. On days of heaviest bird movement, it was necessary on occasion to estimate the number of birds passing. At other times, birds were individually counted. In addition, some birds were identified through capture in single-shelf mist-nets, during several surveys.

RESULTS

The systematic list

Dates and names of observers are given for vagrants and extirpated species where available. The following abbreviations are used to indicate the species status. A question mark indicates uncertain status. Three stars (***) denote threatened species at global level, two stars (**) indicate threatened species at regional level and one star (*) indicates species that are wholly or largely restricted to the Middle East (Evans, 1994). A plus (+) shows species that were previously recorded in the reserve. Lower case abbreviations, *e.g.* r, sb, s, wv and pm indicate that the species is uncommon or rare at the relevant season.

R	=Resident with definite breeding records
SB	=Breeding summer visitor
S	=Non-breeding summer visitor
WV	=Winter visitor
PM	=Passage migrant
FB	=Formerly bred (no records within the last 20 years)
V	=Vagrant
E	=Extinct in Lebanon

Species name is followed first by the species' present status (between brackets) in the reserve and then by the species' known status at the national level (Ramadan-Jaradi & Ramadan-Jaradi, 1999).

Little Grebe *Tachybaptus ruficollis* (pm) R, pm, wv
Extremely rare. One 7 Sep. 96, two 13 Nov. 97, one 4 Apr. 98 and one 5 Sep. 2000.

Great Crested Grebe *Podiceps cristatus* (pm) wv, pm, s
Extremely rare. One 16 Sep. 95, one 13 Sep. 96 and one 25 Oct. 97.

Cory's Shearwater *Calonectris diomedea* (pm, wv) PM, wv
Fairly widespread and not uncommon offshore islands. Seen between 8 Mar. - 29 Apr. and 14 Aug. - 28 Sep. Also large but occasional flocks recorded 6 - 17 Jan. 96, 14 Feb. 97 and 17 Jan. 98.

Yelkouan Shearwater *Puffinus yelkouan* (PM, wv) PM, wv
Common passage migrant in usually small numbers 4 Aug. - 7 Sep. (c.200 off Palm Islands second half Sep. 1998) and 12 Mar. - 25 Apr. Far fewer wintering birds 13 Nov. - 20 Feb.

Leach's Storm Petrel *Oceanodroma leucorhoa* (v) v
Once 12 Oct. 96 near Ramkine island (Ramadan-Jaradi & Ramadan-Jaradi, 1999).

Gannet *Morus bassanus* (wv) wv
Rare but regular offshore islands 22 Nov. - 11 Apr.

Great Cormorant *Phalacrocorax carbo* (wv,pm,s) wv, pm,s
Not uncommon but regularly recorded in small numbers 12 Oct. - 5 Apr. Also non breeding singles seen 5 May and 27 Jun. 96, 2 Jun. and 24 Jul. 97, 3 Jul. 98 and 1 Jul.99.

Pygmy Cormorant *Phalacrocorax pygmeus* *** (pm,s) wv, pm, s
Rare and irregular. One 16 - 19 May 96; one 10 Jun., 7 Jul. 3 Sep. 97 and two 29 Apr. 2000.

White Pelican *Pelecanus onocrotalus* (pm) pm
Four 3 - 4 and six 18 Sep. 97; forty three flying north 20 Mar.; one 25 Apr.,twenty two 23 May 98 and sixteen 7 Oct. 99.

Dalmatian Pelican *Pelecanus crispus**** (pm) pm
Very rare. Two offshore islands 4 Apr. 95, one Palm island 11 Nov. 96 and three flew north 6 Apr. 97.

Little Bittern *Ixobrychus minutus* (pm) SB, pm, wv

Two 16 Sep. 95, one 12 Oct. and 1 Nov. 96, three 6 Apr. 97, and one 4 and 23 Apr. 98.

Night Heron *Nycticorax nycticorax* (PM) sb, PM

About sixty over Palm island 26 May 96, one dead 6 Apr. 97, nine 8 May 97 and twenty-five 14 Aug. 98.

Squacco Heron *Ardeola ralloides* (pm) pm, wv

Very rare. Seven 13 Nov. 97, three 17 Apr. 98 and two 21 May 98.

Cattle Egret *Bubulcus ibis* (pm) pm

Apparently irregular visitor. Four 18 Mar. 96, one 28 Aug. 97 and two 4 Apr. 98.

Little Egret *Egretta garzetta* (PM,wv) PM, wv

Common and regular passage migrant, often in small numbers, 8 Mar. - 16 Jun. and 14 Aug. - 13 Nov. Also scarce winterer 21 Dec. - 9 Feb.

Great White Egret *Egretta alba* (pm) pm, wv, s

Only three sightings: two 18 - 28 Sep. 95, one 12 Oct. 96 and six 23 Apr. 98.

Grey Heron *Ardea cinerea* (PM,WV) PM, WV

Seen various dates in small numbers (4 - 7) from 21 Aug. to 25 May with peaks up to 21.

Purple Heron *Ardea purpurea* + (pm) pm

Often singeltons 16 Mar. - 2 Jun. More regularly observed 28 Aug. - 18 Nov. Previously recorded only once 9 Apr. 56 by Hollom (1956).

Spoonbill *Platalea leucorodia* (pm) pm

Apparently rare passage migrant: nine Palm island 17 Mar. 95, one 9 Sep. 97, two over Ramkine island 4 Apr. 98 and one 4 Oct. 2000.

Greater Flamingo *Phoenicopterus ruber* (v) v, ?pm

Status uncertain or vagrant: two adults Palm island 10 May 95, one Juvenile Sanani island 12 Aug. 95 and single pink feather Palm island 20 Mar. 98. Previously, a total of two shot and stuffed by hunters in springs 86 and 89.

White-fronted Goose *Anser albifrons* (pm) wv, pm

Not uncommon passage migrant. All records belong to flocks flying over or offshore islands. Seen 13 - 20 Nov. and 9 - 22 Mar.

Shelduck *Tadorna tadorna* (pm) pm, wv

Recorded only on passage and in small numbers: 16 Sep. and 18 Nov. 95, 11 Apr. 96, 8 May 97 and 22 Mar. 98.

European Wigeon *Anas penelope* (pm) PM, wv

Uncommon passage migrant 10 Oct. - 18 Nov. and 16 Feb. - 8 May.

Teal *Anas crecca* (pm,wv) PM, WV

Uncommon but regular passage migrant 8 Mar. - 22 Nov. and 16 Sep. - 20 Nov. Also recorded 5 - 21 Dec. 97, 17 Jan., 10 - 25 Feb. 98 and 8-10 Jan. 99.

Mallard *Anas platyrhynchos* + (pm,wv) PM, WV

Recorded in small numbers 18 Sep. - 3 Apr. Previously seen once 4 Jul. 1893 by Stenhouse (1904).

Pintail *Anas acuta* (PM, wv) PM, WV, s

Quite common on passage but scarce in winter. Observed 20 Oct. - 25 Apr.

Garganey *Anas querquedula* (PM) PM

Fairly common passage migrant 8 Mar. - 17 May and to less extent 14 Aug. - 18 Sep.

Shoveler *Anas clypeata* (pm) PM, wv

Apparently very scarce passage migrant. Recorded only on five occasions: three 8 Mar. 96, up to five 16 - 19 Mar. 97, two 2 Oct. 97, 20, 1 - 5 Apr. 98 and two 29 Oct. 2000.

Pochard *Aythya ferina* (pm) pm, wv

Very rare passage migrant. Two 2Nov.95, one 12 Oct. 96, two 22 Mar. 98 and one 7 Mar. 99.

Ferruginous Duck *Aythya nyroca* ** (pm) pm, wv, s

Apparently extremely rare passage migrant. One spring record Palm island 12 Mar. 98.

Red-breasted Merganser *Mergus serrator* (v) -

Only one record of two males and one female off Palm island 2 Mar. 99 (Ramadan-Jaradi and Bara, *unpubl.*)

Common Merganser *Mergus merganser* (v) -

Six females and one male recorded Palm island 7 Mar. 98 (Bara, 1998)

White-tailed Sea Eagle *Haliaeetus albicilla** (v) v

One single sighting: one adult Palm island 11 Oct. 96 (Ramadan Jaradi & Ramadan Jaradi, 1999).

Egyptian Vulture *Neophron percnopterus*** (pm) FB, PM

Apparently extremely rare and irregular passage migrant. An immature on the light-house of Ramkine island 6 Jun. 96, and one adult Palm island 3 and 18 Sep. 97.

Marsh Harrier *Circus aeruginosus* (pm) ?FB, PM, wv

Quite rare passage migrant. One 3 Apr. and 20 Apr. 96, one 19 Mar. and two 18 Sep. 97, and one 22 Mar. 98.

Spotted Eagle *Aquila clanga* (v) pm

One recorded occasionally over Palm island 16 Nov. 96. Probably deviated from its usual Levant migration route by the easterly of the previous day.

Osprey *Pandion haliaetus* (pm) pm

Singles observed regularly 4 - 23 Apr. and 16 Sep. - 11 Oct.

Lesser Kestrel *Falco naumanni**** (pm) FB, pm, s

Recorded twice: 11 Mar.- 17 Apr. 99 and 26 Oct. 2000.

Red-footed Falcon *Falco vespertinus* (pm) pm

Rather scarce passage migrant. Singeltons seen 16 Sep. 96, 20 Apr. and 5 May 96, 29 Apr. and 2 Oct. 97.

Lanner *Falco biarmicus*** (pm) pm, wv, ?sb

Observed thrice: one 2 Nov. 95, one 25 Oct. and one 13 Nov. 97.

Saker Falcon *Falco cherrug*** (pm, wv) pm, wv

Very scarce passage migrant and winter visitor. Two 14-21 Mar. 99 and one 2-23 Jan. 2000.

Peregrine Falcon *Falco peregrinus* (pm, ?wv) ?FB, pm, wv

One winter record 10 Dec. 96 and three passage records: one 6 Apr., one 18 Sep. 97, and one 1 - 4 Apr. 98.

Quail *Coturnix coturnix* + (sb,PM) sb, PM, wv

Common passage migrant 16 Feb. - 21 May and 7 Sep. - 18 Nov. Few breeding summer visitors occur Mar. - early Jun. (family of 5 chicks 21 Apr. 98).

Spotted Crane *Porzana porzana* (pm) PM, wv

Regular but scattered spring passage 14 Mar. - 5 May. Scarcer 6 Sep. - 17 Oct.

Spotted Crane *Porzana parva* (pm) pm

Annually recorded and exclusively in autumn and in small numbers 18 Sep. - 6 Oct.

Corncrake *Crex crex**** (pm) pm

Regularly observed during May, normally with peaks up to 6 individuals.

Moorhen *Gallinula chloropus* (pm) R, PM, wv

Extremely rare passage migrant: two 4 Apr. 95, one 5 - 17 Apr. 98 and one 29 Mar. 2000.

Coot *Fulica atra* (pm) R, PM, WV

Scarce passage in small numbers 18 Sep. - 6 Oct. and 3 - 25 Apr.

Crane *Grus grus* (pm) pm

Very rare autumn passage 12 Oct. - 18 Nov. and uncommon 8 Mar. - 4 Apr. with peaks up to 65 individuals.

Oystercatcher *Haematopus ostralegus* (v) v

Two occasional records: one 5 May 95 and one 24 May 98.

Black-winged Stilt *Himantopus himantopus* + (PM) PM

Common and abundant passage migrant 8 Mar. - 20 May and 15 Aug. - 25 Oct.

Avocet *Recurvirostra avosetta* (pm) pm

Scarce but regular passage in ones or twos 8 Mar. - 10 May and 9 Aug. - 13 Sep.

Collared Pratincole *Glareola pratincola* + (pm) pm

Quite uncommon passage migrant 4 Apr. - 23 May and 21 Aug. - 2 Nov.

Black-winged Pratincole *Glareola nordmanni** (pm) pm

Rare passage 6 Apr. - 21 May and 13 Sep. - 6 Oct.

Little Ringed Plover *Charadrius dubius* (PM, s) PM, s

Fairly common spring passage 22 Mar. - 5 May and scarcer 14 Aug. - 11 Oct. Very few non breeding birds oversummer Jun. - late Jul.

Ringed Plover *Charadrius hiaticula* + (PM,wv,s) PM, wv, s

Commonly recorded 19 Mar. - 7 Jun. and 14 Aug. - 25 Oct. Scarce winter visitor 22 Nov. - 8 Mar. Very few non breeding singeltons oversummer Jun. - Jul.

Kentish Plover *Charadrius alexandrinus* (pm,s) pm, s

Scarce passage migrant 12 Mar. - 21 May (with peaks up to 10 second half Apr.) and 9 Aug. - 20 Nov. Few non breeding oversummer Jun. - Jul.

Greater Sand Plover *Charadrius leschenaulti* (pm) pm

Rare passage migrant in small numbers 8 Mar. - 29 Apr. and 27 Jul. - 18 Sep.

Grey Plover *Pluvialis squatarola* + (pm,wv) pm, wv
Very scattered records 28 Aug. - 23 May.

Spur-winged Plover *Hoplopterus spinosus* (pm) pm
Rare passage migrant 22 Mar. - 10 Jun. and 9 Aug. - 20 Oct.

Lapwing *Vanellus vanellus* (pm) PM, WV
Uncommon on passage across islands. Recorded in small numbers 16 Sep. - 11 Oct.
and 18 Mar. - 20 Apr.

Little Stint *Calidris minuta* (PM) PM
Widespread and common passage migrant 8 Mar. - 21 May and 9 Aug. - 20 Oct.

Temminck's Stint *Calidris temminckii* (v, ?pm) pm
Extremely rare passage migrant or vagrant. One single observation 17 Apr. 98.

Curlew Sandpiper *Calidris ferruginea* (pm, s) pm, s
Few individuals seen 14 Aug. - 17 Oct. and more regularly 20 Apr. - 8 May. Very
small numbers oversummer Jun. - Jul.

Dunlin *Calidris alpina* (PM,WV) PM, WV
Common passage migrant 14 Aug. - 13 Nov. and to less extent 6 Apr. - 21 May.
Also regular in fair numbers Dec. - Feb.

Ruff *Philomachus pugnax* (PM,wv) PM, wv, s
Common and abundant passage migrant 16 Feb. - 25 May and 9 Aug. - 13 Nov.
Also two winter records 10 - 12 Feb. 98.

Common Snipe *Gallinago gallinago* (pm,wv) pm, wv
Rare but regular passage migrant and winter visitor. Singeltons seen 18 Sep. - 19
Mar.

Great Snipe *Gallinago media*** (pm) pm
Few scattered but quite regular sightings between 22 Mar. and 14 May.

Black-tailed Godwit *Limosa limosa* (pm, ?v) pm
Apparently extremely rare passage migrant. Recorded once 17 Apr. 98.

Whimbrel *Numenius phaeopus* + (pm) pm
Scarce but regular passage migrant 4 - 23 Apr. and 28 Aug. - 17 Oct.

Redshank *Tringa totanus* + (pm) pm

Scarce and regular 8 Mar. - 29 Apr. and 4 Aug. 21 Dec.

Marsh Sandpiper *Tringa stagnatilis* (pm) pm, ?wv
At least up to four 8 - 11 Sep. 98 and fourteen 28 Sep. 99.

Greenshank *Tringa nebularia* (PM, wv) PM, wv
Apparently common passage migrant and scarce winter visitor. Recorded 8 Mar. - 29 Apr., 19 Jul. - 25 Oct. and 11 Jan. - 20 Feb.

Green Sandpiper *Tringa ochropus* (PM, wv) PM, wv
Common passage migrant 20 Feb. - 26 Jun. and 3 Aug. - 17 Oct. Also some overwinter in very small numbers 6 Jan. - 20 Feb.

Wood Sandpiper *Tringa glareola* (PM) PM
Common and abundant passage migrant 12 Feb. - 23 May and 15 Aug. - 2 Nov.

Common Sandpiper *Actitis hypoleucos* + (PM,wv,s) PM, wv, s
Common passage 16 Mar. - 21 May and 14 Aug. 18 Nov. Scarcer in winter 7 Dec. - 20 Feb. Few non breeding oversummer 10 Jun. - 24 Jul.

Turnstone *Arenaria interpres* (pm) pm
Very few records of singles on six occasions between 16 Feb. and 8 May. Also one 2 Oct. 98 and six 7 Sep. 2000.

Arctic Skua *Stercorarius parasiticus* (v,?pm) v, ?pm
Only one record 21 Feb. 98 on Palm island (Bara, 1998).

Great Black-headed Gull *Larus ichthyaetus* (v,?pm) v
One sighted Palm island 1 - 4 Apr. 98.

Little Gull *Larus minutus* (pm,wv) pm, wv
Scattered records of singles among flocks of other gull species between 7 Sep. and 10 May.

Black-headed Gull *Larus ridibundus* (PM,WV) PM, WV
Common and abundant passage migrant and winter visitor with peaks up to c.2200. Seen 21 Aug. - 29 Apr.

Slender-billed Gull *Larus genei* (pm,wv) pm, wv
Two 13 Dec. 95, one 2 Feb. 97, up to four 17 Jan. 98, seven 22 Mar. - 25 Apr. 98 and three 3 Feb. 99.

Audouin's Gull *Larus audouini**** + (v,?pm) FB, v, ?pm

Vagrant or most probably extremely rare passage migrant: ten 23 Aug. 97, two 1-4 Apr. 98, one 25 Apr. 98 and one juvenile 6 Jul. 2000. Formerly bred on Palm island (Stenhouse 1904).

Mew Gull *Larus canus* (WV,pm,s) WV, pm, s
Scarce passage migrant 8 - 19 Mar. and 2 Nov. - 16 Dec. Also quite common winter visitor 24 Dec. - 26 Feb., with few non breeding oversummer 6 Jun. - 19 Jul.

Lesser Black-backed Gull *Larus fuscus* (PM, WV,s) PM, WV, s
Common and abundant passage migrant 12 Mar. - 25 May and 14 Aug. - 2 Nov. Also common winterer 11 Nov. - 8 Mar.

Yellow-legged Gull *Larus cachinnans* +(R,PM,WV,S)R, PM,WV, S
Fairly common passage migrant with peaks up to c. 500 from 12 Mar. to 25 May and 9 Aug. to 1 Nov. Also quite common winterer 13 Nov. - 20 Feb. with few non breeding oversummer May - Jul. The reserve is the only refuge for the breeding population in Lebanon which is today of c.65 individuals. Of which only c.14 pairs breed annually.

Great Black-backed Gull *Larus marinus* (pm) pm, wv
Recorded once: one off Palm island 5 May 96 (Ramadan-Jaradi & Ramadan-Jaradi, 1999)

Lesser Crested Tern *Sterna bengalensis* + (e) FB, e
Has bred on Palm island in 1895 (Stenhouse 1904). No further records since then up to-day.

Sandwich Tern *Sterna sandvicensis* (pm,wv) pm, wv
very rare passage migrant and winter visitor 9 Aug. - 17 Apr.

Common Tern *Sterna hirundo* + (PM) FB, PM
Formerly bred Palm island (Stenhouse 1904). Now a common passage migrant 5 Apr. - 23 May and 14 Aug. - 6 Oct. Also five recorded 21 Feb. 98 (Bara, 1998).

Little Tern *Sterna albifrons* + (v) FB, v
Formerly bred Palm Island (Stenhouse 1904). Now one single record 4 Apr. 98.

Whiskered Tern *Chlidonias hybridus* (pm) sb, pm
Apparently scarce passage migrant: one 4 Apr. 95, one 21 Aug. 96, one 6 Apr. 97, two 8 May 97, one 18 Sep. 97, and one 17 Apr. 98.

White-winged Black Tern *Chlidonias leucopterus* (pm) PM
Few singles scarcely seen 19 Mar. - 14 May and 12 - 25 Oct.

Turtle Dove *Streptopelia turtur* (?sb, PM) sb, PM

Common and abundant passage migrant 22 Mar. - 7 Jun. and 23 Aug. - 18 Nov.
Seen in May in pairs and one heard singing but without direct evidence of breeding.

Great Spotted Cuckoo *Clamator glandarius* (pm) FB, pm, ?sb

Very rare passage migrant: one 7 Sep. 96, one 16 Mar. 97, and one 1 Apr. 98. Also recorded Palm island 21 Feb. 98 (Bara, 1998).

Cuckoo *Cuculus canorus* (PM) sb, PM

Quite common passage migrant 8 Mar. - 5 May and 3 - 18 Sep.

Little Owl *Athene noctua* (?r) R

Presumably rare resident (although no records in Jan. - Feb.). Recorded regularly during breeding season and heard singing at least in two localities but no direct evidence of nesting.

Nightjar *Caprimulgus europaeus* (pm) FB, PM, ?sb

Scattered records of singles 12 Mar. - 23 May. Also one 6 - 17 Oct. 96, one 1 Jul. - 18 Sep. 97 and two 11 Sep. 20 Oct. 2000.

Swift *Apus apus* (PM) SB, PM

Common and abundant passage migrant 26 Feb. - 10 May and to less extent 15 Jun. - 18 Nov.

Pallid Swift *Apus pallidus* (sb, pm) sb, pm

A small colony of breeding summer visitors found nesting in Ramkine island (Ramadan-Jaradi & Ramadan-Jaradi, 1997). Otherwise, uncommon passage migrant 12 Feb. - 14 May and 27 Jun. - 18 Sep.

Kingfisher *Alcedo atthis* (PM, wv, s, ?r) PM, wv, s, ?r

Singles recorded throughout the year but without direct evidence of breeding. Numbers are supplemented 8 Mar. - 5 May and 14 Aug. - 22 Nov.

Hoopoe *Upupa epops* + (sb, PM, wv) R, sb, PM, wv

Breeding confirmed. Quite uncommon breeding summer visitor to islands. Found nesting during May 98 in borrows of rabbits. Also common on passage 8 Mar. - 29 Apr. and 15 Aug. - 2 Nov. Very few overwinter Dec. - Jan.

Wryneck *Jynx torquilla* (pm) pm

Only one record 12 Mar. 98. Probably overlooked at other times.

Calandra Lark *Melanocorypha calandra* (pm) r, PM, wv

Scarce but regular passage migrant in fairly small numbers 20 Feb. - 6 Apr. and 18 Sep. - 18 Nov.

Greater Short-toed Lark *Calandrella brachydactyla* (pm) sb, PM, wv
Quite rare passage migrant 7 Sep. - 20 Nov. and 8 Mar. - 17 Apr.

Lesser Short-toed Lark *Calandrella rufescens* (pm) sb, pm, wv
Only spring scattered but regular records 4 Apr. - 8 May.

Skylark *Alauda arvensis* (pm, wv) FB, PM, WV, s
Uncommon passage migrant and winter visitor 6 Oct. - 11 Apr.

Crag Martin *Ptyonoprogne rupestris* (sb, pm) sb, PM, wv, ?r
Small population of breeding summer visitors found nesting 11 Apr. - 2 Jun.
(Ramadan-Jaradi & Ramadan-Jaradi, 1999). Also small flocks and singles recorded
26 Feb. - 23 Apr. and 18 Sep. - 20 Nov.

Swallow *Hirundo rustica* (PM, wv) SB, PM, wv
Common and widespread passage migrant 12 Feb. - 21 May and 9 Jul. - 13 Nov.
Also very scarce winter visitor Dec. - Feb.

Red-rumped Swallow *Hirundo daurica* (pm) sb, pm
Uncommon and very scattered on passage 16 Mar. - 17 Apr. and 3 - 28 Sep.

House Martin *Delichon urbica* (PM) SB, PM
Fairly common on passage 9 Feb. - 21 May and much less 13 Sep. - 25 Oct.

Tawny Pipit *Anthus campestris* (sb, PM, wv) sb, PM, wv
Breeds in moderate numbers (Apr. - mid-Jul.). Also abundant and regular passage
migrant 20 Feb. - 8 May and 15 Aug. - 25 Oct. Very few overwinter 18 Nov. - 16
Feb.

Long-billed Pipit *Anthus similis* (wv) r
Only recorded as winter visitor in very small numbers 17 Jan. - 20 Feb.

Red-throated Pipit *Anthus cervinus* + (pm) PM
Scarce spring passage migrant 8 Mar. - 13 Apr. and to less extent 18 Sep. - 6 Oct.

Water Pipit *Anthus spinoletta* (pm, wv) PM, wv
Scarce passage migrant 14 Feb. - 17 Apr. and scarcer 13 Sep. - 18 Nov.

Yellow Wagtail *Motacilla flava* (pm) sb, PM
Small numbers recorded on passage 8 Mar. - 6 Jun. and 3 Sep. - 20 Oct.

Citrine Wagtail *Motacilla citreola* (v) v, ?pm
One single record 5 Apr. 98.

Grey Wagtail *Motacilla cinerea* (pm, wv) sb, pm, wv

Uncommon passage migrant and scarce winter visitor 13 Sep. - 17 Apr.

White Wagtail *Motacilla alba* + (sb,PM,WV) sb, PM, WV, s
Breeding reconfirmed. Scarce and irregular breeding summer visitor in very small numbers to islands where formerly bred early last century (Stenhouse 1904). Also abundant passage migrant and winter visitor 18 Sep. - 5 Apr.

Thrush Nightingale *Luscinia luscinia* (pm) pm
Recorded thrice: one 16 Sep. 95, one 27 Jul. 97 and one 21 May 98.

Bluethroat *Luscinia svecica* (pm) PM, wv
Apparently extremely rare on passage: at least two 12 - 20 Mar. 98, one 2 Apr. 99 and two 5 Apr. 2000.

Black Redstart *Phoenicurus ochruros* (sb, PM, wv) R, sb, PM, wv
Scarce but regular breeding summer visitor. Also occur commonly on passage 20 Feb. - 17 Apr. and 12 Oct. - 22 Nov. Few individuals overwinter Dec. - Feb.

Redstart *Phoenicurus phoenicurus* (pm) sb, PM
Uncommon passage migrant 18 Mar. - 27 May and 13 Sep. - 18 Nov.

Isabelline Wheatear *Oenanthe isabellina* (pm) SB, PM
Scarce and scattered passage migrant 23 Feb. - 11 Apr. and 14 Aug. - 2 Nov.

Wheatear *Oenanthe oenanthe* (PM) SB, PM, wv
Rather uncommon passage migrant 26 Feb. - 5 May and commoner 21 Aug. - 13 Nov.

Cyprus Pied Wheatear *Oenanthe cypriaca* (v) v, ?pm
Only one record 14 Mar. 97 (Ramadan-Jaradi & Ramadan-Jaradi, 1999).

Rock Thrush *Monticola saxatilis* (pm) SB, pm
Apparently irregular passage migrant: one juvenile 7 Sep. 96, at least two 18 Sep. 97 and one 5 Apr. 98.

Blackbird *Turdus merula* (pm, wv) R, pm, wv
Very scarce passage migrant and winter visitor to islands. Irregularly recorded in ones or twos 12 Oct. - 8 Mar.

Song Thrush *Turdus philomelos* (pm, ?wv) PM, wv
Very uncommon passage migrant 6 Oct. - 2 Nov. and 20 Feb. - 3 Apr., and very scarce winter visitor 22 Nov. - 26 Feb.

Fan-tailed Warbler *Cisticola juncidis* (wv) r

One 24 Dec. 96, at least four 14 - 20 Feb. 97 and two 17 Jan. 98.

Graceful Warbler *Prinia gracilis* (R) R

Very common breeding resident all over where vegetation is found.

Savi's Warbler *Locustella luscinioides* (pm) sb, pm

Very scarce passage migrant across islands 19 Mar. - 25 Apr. and 21 Aug. - 6 Oct.

Great Reed Warbler *Acrocephalus arundinaceus* (pm) SB, PM

Rather uncommon and scattered passage migrant 12 Mar. - 13 Apr. and much less 9 Aug. - 17 Oct.

Olivaceous Warbler *Hippolais pallida* (pm) SB, PM

Uncommon but regular passage migrant 14 Mar. - 5 May and 21 Aug. 28 Sep.

Upcher's Warbler *Hippolais languida** (pm) SB, pm

Scarce to uncommon passage migrant 23 Apr. - 2 Jun. and 14 Aug. to 7 Sep.

Icterine Warbler *Hippolais icterina* (pm) pm

Scarce passage migrant occurring in small numbers 17 Apr. - 10 May and 28 Aug. - 2 Oct.

Sardinian Warbler *Sylvia melanocephala* (pm, wv) R, PM, WV

Uncommon passage migrant and winter visitor 13 Sep. - 29 Apr.

Rüppell's Warbler *Sylvia rueppelli* + (pm) ?sb, pm

Scattered and scarce spring passage 14 Mar. - 20 Apr. Previously recorded 4 Jul 1893 by Stenhouse (1904).

Orphean Warbler *Sylvia hortensis* + (PM) SB, PM

Quite common passage migrant 5 Mar. - 8 May and 24 Jul. - 6 Oct.

Lesser Whitethroat *Sylvia curruca* (pm) SB, PM, ?wv

Very rare passage migrant 8 Mar. - 29 Apr. and 16 Sep. - 12 Oct.

Whitethroat *Sylvia communis* + (pm) SB, PM

Common passage migrant 26 Feb. - 10 May and 23 Aug. - 13 Nov.

Blackcap *Sylvia atricapilla* + (sb, pm, wv) SB, PM, WV

Uncommon breeding summer visitor (Ramadan-Jaradi & Ramadan-Jaradi, 1997), and uncommon passage migrant and winter visitor 4 Aug. - 25 May.

Wood Warbler *Phylloscopus sibilatrix* (pm) FB, PM

Quite common passage migrant 22 Mar. - 10 May and 28 Aug. - 17 Oct.

Chiffchaff *Phylloscopus collybita* (PM, wv) PM, WV
Common passage migrant and scarce winter visitor 12 Sep. - 14 May.

Willow Warbler *Phylloscopus trochilus* (pm) PM
Rarely but regularly recorded 14 Mar. - 21 Apr. and 21 Aug. - 18 Nov.

Spotted Flycatcher *Muscicapa striata* (PM) SB, PM
Common on migration 17 Apr. - 8 May and 3 Sep. - 2 Oct.

Collared Flycatcher *Ficedula albicollis* (pm) PM
Only two spring records: one 6 Apr. 97 and one 22 Mar. 98.

Red-backed Shrike *Lanius collurio* (PM) SB, PM
Common passage migrant 11 - 29 Apr. and 16 Sep. - 17 Oct.

Woodchat Shrike *Lanius senator* (pm) sb, PM
Uncommon passage 14 Mar. - 3 Apr. and 13 - 28 Sep.

Masked Shrike *Lanius nubicus* (pm) SB, PM
Scarce passage migrant 8 Mar. - 6 Apr. and 3 - 28 Sep.

Ortolan Bunting *Emberiza hortulana* (pm) sb, PM
Uncommon and scattered passage migrant 22 Mar. - 23 Apr. and 21 Aug. - 12 Oct.

Cretzschmar's Bunting *Emberiza caesia* (pm) sb, PM
Uncommon passage migrant 8 - 19 Mar. and 3 - 28 Sep.

Black-headed Bunting *Emberiza melanocephala* (PM) SB, PM
Rather common passage migrant 13 Apr. - 25 May and fewer 7 Sep. - 12 Oct.

Corn Bunting *Miliaria calandra* (PM) R, PM, WV
Quite common passage migrant 5 Mar. - 1 Apr. and 11 Oct. - 18 Nov.

DISCUSSION AND CONCLUSION

However complete the above list may be, it must be kept in mind that there are still many gaps in the information about the species because some of the surveys were thwarted by the vagaries of the weather, most notably sea storms and by delays in obtaining permission to visit the islands. Thus, visits were not quite evenly distributed along the year. Consequently, the periods given for passages are not necessarily representative of the real dates of their arrival and departure but the periods during which these birds were contacted.

During the period 1893-2000, certain changes have occurred in the islands' ornithological scene which deserve attention:

Firstly, four species (*Larus audouini*, *Sterna bengalensis*, *Sterna hirundo* and *Sterna albifrons*) were published by Stenhouse (1904) as breeding but stopped to do so, at least from 1956 onward. Furthermore, one of these species (*S. bengalensis*) apparently ceased from appearing in Lebanon. The extirpation of these four species from the islands is not surprising since insular communities are known to be very susceptible to persecution, disturbance and development. All these factors (hunting, eggging, feeding on nestling, recreational, commercial and agricultural activities, military occupation, fishing with dynamite near the islands, *etc.*) prevailed in the area prior to its declaration a protected area. Only the Yellow-legged Gull *Larus cachinnans* obtaining, throughout the year, ample food from human waste resisted. This was not the case of the extirpated species which, mostly rely on natural food.

Secondly, the total islands community exhibited in 1996-2000 over trice as many breeding species as past studies had shown. Other than the extirpated birds, the Yellow-legged gull *Larus cachinnans*, the Tawny Pipit *Anthus campestris* and the White Wagtail *Motacilla alba* formed alone, prior to this longer-term study, the breeding bird list of the islands as apparently not all potential breeding areas were exhaustively searched. The contrast between the past and the present increased dramatically as a result of the bird massacre during the seventies and eighties thus dropping the breeding populations to almost null.

However, the richness (10 breeding species) of the reserve remains relatively low, most probably due to the insularity (Ramadan-Jaradi, 1989) accentuated by the alteration of the vegetation cover by rabbits, the low variety of climates and habitats and the exposure of the flat islands to wind and particularly sea storms. Nevertheless, the breeding birds (up to 50 % of the breeding individuals) of the reserve brave these constraints by nesting in protected sites such as holes and borrows (Pallid Swift, Crag Martin, Hoopoe, *etc.*), while the other half breeds either in sheltered ground nests (Tawny Pipit, Quails *etc.*) or in low scrubs or shrubs (Graceful Warbler).

Thirdly, the large number of migrating birds at the reserve (135 species) was not wholly surprising too. Tohmé & Neuschwander (1974) have already speculated about the importance of Palm Islands for migrants. However, the fact that 37% of migrants of Lebanon (Ramadan-Jaradi & Ramadan-Jaradi, 1999) are passing by and over the islands poses once again several questions as regards to origin, destination and the routes they take from Eurasian breeding grounds to Africa and *vice versa*. Hence, the necessity of establishing a permanent bird ringing centre on the protected area.

The use of the reserve by many migrants as a suitable feeding and resting sites, particularly by the 42 species known to breed afterward on the Lebanese mainland (Ramadan-Jaradi & Ramadan-Jaradi, 1999); together with the fact that 5 threatened species at global level, 5 threatened at regional level and 2 restricted species to Middle East; occur here, make it clear that the Palm Islands Reserve is of unique national and regional significance.

Remarkable in the group of migrants is the scarcity of many species whose arriving dates are relatively earlier than those of the mainland. In this sense, the islands prove to be among the first stop-over areas for many sea crossing species of broad migration front. Similarly, the rarity of winterers, particularly passerines, indicate that the islands are unsuitable in winter not only because of their small surface area but also because of their exposure to severe climatic factors and scarcity of food.

It is worth mentioning that the broad-winged soaring raptor species migrate along the coastal strip and high over the mountains, and therefore it would not be unexpected to pass over the islands. However, this was not the case for the Eagle *Aquila clanga* because its appearance followed a sudden storm which deviated it slightly from its usual Levant migration route. Conversely, the remaining raptor species recorded, Harriers *circus*, Falcons *Falco* and to some extent Egyptian Vulture *Neophron percnopterus* are more active migrants, and thus do not necessarily avoid sea crossings.

Finally, this paper is expected to enrich our understanding of migratory patterns and will provide relevant information for a more effective management plan of the avifauna of the Palm Islands Nature Reserve.

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REFERENCES

- Bara, T. 1998. Selected records from Cheikh Zennad, a coastal wetland in north-west Lebanon. *Sandgrouse*, 20: 40-45.

- Blondel, J. 1975. L'analyse des peuplements d'oiseaux, éléments d'un diagnostic écologique. *Terre et Vie*, 29: 533-589.
- Blondel, J., Ferry, C. & Frochot, B. 1981. Point counts with unlimited distance. *Studies in Avian Biol.*, 6: 414-420.
- Cramp, S. and Simmons, K. E. L. (eds.) 1977 ; 1980 . *The birds of the Western Palearctic*. Volumes 1 and 2 . Oxford University Press.
- Cramp, S. (ed.) 1985; and 1988. *The birds of the Western Palearctic*. Volumes 4 and 5. Oxford University Press.
- Cramp, S. (ed.) 1988. *The birds of the Western Palearctic*. Vol. 5. Oxford University Press.
- Evans, M. I. 1994. *Important Bird Areas in the Middle East*. BirdLife International (BirdLife Conservation Series No. 2), Cambridge.
- Hollom, P. A. D. (1959) Notes from Jordan, Lebanon, Syria and Antioch. *Ibis*, 101: 183-200.
- Ramadan-Jaradi, G. 1989. The avifauna of palm groves and other irrigated areas of the United Arab Emirates and its relations with continental insularity. *Le Gerfaut*, 79: 81-90.
- Ramadan-Jaradi, G. 1996a. *Étude de la diversité biologique du Liban. Les Oiseaux*. Projet GF/6105-92-72. Publ. No. 4: 13-26.
- Ramadan-Jaradi, G. 1996b. *Étude de la diversité biologique du Liban. Les Oiseaux*. Projet GF/6105-92-72. Publ. No. 9: 95-102.
- Ramadan-Jaradi, G. and Ramadan-Jaradi, G. 1997. Notes on some breeding birds of Lebanon. *Sandgrouse* , 19: 122-125.
- Ramadan-Jaradi, G. and Ramadan-Jaradi, G. 1999. An updated checklist of the birds of Lebanon. *Sandgrouse*, 21: 132-170.
- Stenhouse, J. H. 1904. The birds of Nakhil island on the coast of Syria. *Ibis* , (VIII) 4: 29-32.
- Tohmé, G. and Neuschwander, J. 1974. Nouvelles données sur l'avifaune de la République Libanaise. *Alauda*, 13: 243-258.
- Tohmé, G. and Tohmé, H. 1986. *The birds of Lebanon* (in Arabic). Lebanese University, Sec. Sci. Nat. No. 17.
- Tohmé, H. 1999. Study report on the flora of Palm Islands Nature Reserve (in Arabic), *Ministry of Environment*. Lebanon.

